REMARKS

Amendments to the Claims

Claims 10 - 12 were previously cancelled. Claims 13 and 19 are amended to remove the claim term "linear trough" objected to by the Examiner. Claims 9 and 15 are amended to include all the limitations of the base claim and are believed to be in condition for allowance. Upon entry of the amendment Claims 1 - 9 and 13 - 19 are presented for consideration by the Examiner.

Objections to the Drawings

The Examiner objected to the drawings as failing to show the "linear trough" recited in claims 13 and 19. This feature has been deleted from the claims, obviating the Examiner's objection to the drawings.

Claim Rejection – 35 U.S.C. §112

Claims 13 and 19 were rejected as indefinite for reciting "linear trough." This term has been deleted from claims 13 and 19, obviating any 35 U.S.C. §112 rejection properly raised by the Examiner.

Claim Rejections – 35 USC § 103(a)

Claims 1 – 4, 13, 14 and 16 - 19 are rejected under 35 USC § 103(a) as being unpatentable over U.S. Patent No. 5,149,234 (Durfee) in view of U.S. Patent Publication No. 2004/0151553, now U.S. Patent No. 7,140,815 (George).

Rejected Independent Claims 1 and 13

Claim 1 recites:

A spot drilling insert comprising:
an insert body supporting a drill point for rotation in a cutting direction about a rotational axis, said drill point comprising:

a chisel edge supported by the drill point, said chisel edge having diametrically opposite ends;

a pair of linear cutting edges, each cutting edge extending from one end of the chisel edge and inclined at an angle relative to said rotational axis, said cutting edge formed at an intersection of a substantially planar first flute surface and a substantially conical land surface, said land surface having an axis of curvature offset relative to said rotational axis,

wherein said chisel edge and cutting edges are centered on said rotational axis and each said land surface radially approaches said axis of rotation in a direction opposite said cutting direction. (emphasis added)

Claim 13 recites:

A spot drilling insert comprising:

an insert body having a first end and a second end supporting a drill point for rotation in a cutting direction about a rotational axis, said drill point comprising:

two diametrically opposed substantially conical land surfaces extending rearwardly and outwardly from a tip of said drill point, each said land surface having an axis of curvature offset relative to said rotational axis, each said land surface radially approaching said axis of rotation in a direction opposite said cutting direction;

two diametrically opposed flutes, each said flute comprising a substantially planar first flute surface intersecting one of said land surfaces to form a cutting edge, said **flutes arranged to converge as they approach said tip and angularly overlap behind said tip.** (emphasis added)

Each of independent claims 1 and 13 recite a specific structure for the claimed drill point that is not disclosed, taught or suggested by Durfee orGeorge, either alone or in combination.

In the rejection issued August 5, 2008, the Examiner relies heavily on Durfee, supplemented by George to teach the specific structures and relationships recited in Applicant's independent claims 1 and 13. As demonstrated below, neither Durfee or George, either alone or in combination disclose, teach or suggest the specific configurations and relationships recited in Applicant's claims 1 and 13.

Teachings of Durfee

Durfee teaches a Spot-Weld Removing Tool with an integral shank designed for use with a hand-held drill. Durfee, col. 2, lines 48-55. Durfee discloses a particular rotary cutting tool configuration for removing spot welds in sheet metal assemblies. The cutting tool includes a cutting body 12 having a forward portion 15 and rearward portion 17 connected to each other and extending integrally from a shank 20. A front end 14 of the forward portion 15 includes a base surface 22.

Regarding the position and configuration of the disclosed "pilot unit" 24, Durfee states:

> A pilot unit or pilot means 24 having an outside surface 26 with a semi-conical configuration extends outwardly from a central part of the base surface 22. In the illustrative embodiment, the cone of the pilot unit at a tip 25 has an angle alpha of approximately 90°. (see FIG. 2). In the alternative embodiments, the angle .alpha might vary from 60°. to 120°.
>
> FIG. 2, which is a cross-sectional view of the spot-weld removing tool, illustrates that **the pilot unit 24 is positioned eccentrically on the base surface and the cutting body**, i.e., the longitudinal axis A--A of the shank 20 and cutting body 12 is located at a predetermined distance C from the tip 25 of the pilot unit. In the illustrative embodiment, the distance C is about 0.015". However, other lengths of the distance C are also permissible.
>
> The cutting body 12 of the present invention is provided with a fluted section 21 which is preferably a single sided flute. Such fluted section 21 extends in the cutting body from the pilot unit 24 and the front end 14 in the direction of the rear end 16. The fluted section 21 is formed by first 28 and second 30 surfaces extending inwardly from the exterior of the cutting body and intersecting each other along line B--B. **In the illustrative embodiment of the invention, the first surface 28 is substantially flat and lies within the plane of the longitudinal axis A--A.** In the same embodiment, the second surface 30 is curved, so that the first and second surfaces intersect each other at the curved line B--B. It should be noted that the flute section having both surfaces manufactured substantially flat and intersecting each other along a straight line, is within the scope of this invention.
>
> A main cutting edge 36 is defined at the intersection of the first surface 28 and the base surface 22. **Since the first and second surfaces extend into the pilot means 24, an auxiliary cutting edge 38 is formed at the intersection of the outside surface 26 of the**

> **pilot means 24 and the first surface 28.** (emphasis added, Durfee, col. 3, lines 16-54)
>
> Regarding the function of the disclosed pilot means 24, Durfee states:
>
> In view of the eccentrical positioning of the pilot tip 25 on the base surface, during the initial drilling, an oversized pilot hole is quickly produced providing additional stability for the conical surface of the pilot unit. (Durfee, col. 4, lines 58-62)

It is clear that the Examiner is proposing a wholesale re-design of the spot weld removing tool disclosed in Durfee. As an initial matter, Durfee does not disclose, teach or suggest a "spot drilling insert" having an "insert body" as recited in both claims 1 and 13. The tool in Durfee is a standard rotary tool with an integral shank for use in a standard rotary tool.

The Durfee tool design specifies an eccentrically positioned pilot means having a single, semi-conical outside surface 26. Durfee also discloses a cutting tool with a single cutting edge 36, 38 and a single flute 21. Cutting tip 42 and pilot tip 25 are both specified as eccentrically positioned with respect to the longitudinal axis A-A of the shank 20. Durfee discusses the advantages of the eccentric positioning of the cutting elements of the disclosed rotary cutting tool with respect to the inside surface of the drilled hole. Durfee, col. 4, lines 35. The advantages include reduced friction and extended tool life.

Examiner's Proposed Modification of Durfee is Non-Functional

The Examiner proposes that those of skill in the art would modify the tool of Durfee to include the two cutting edges and two conical land surfaces as recited in claims 1 and 13. Those working in the field of rotary cutting tools would never attempt such a modifications because the entire configuration of the Durfee rotary tool would be altered, including the desirable attributes specified by Durfee.

Since the pilot means 24 is eccentrically positioned, only one cutting edge can possibly be active, that is, the cutting edge formed at the radially outward most position of the conical outsides surface 26 of the pilot means 24. A cutting edge formed at any other position on the conical outside surface of the pilot means 24 would not make contact with the material being cut and would be completely superfluous. To be effective, both of the proposed cutting edges would have to be centered on the axis of rotation A-A of the shank, a design that is not compatible with the teachings of Durfee.

In addition, Durfee specifies that the planar surface 28 which intersects the base surface 22 and pilot means 24 to form cutting edges 36, 38 "lies within the plane of the longitudinal axis A-A." Durfee, col. 3, lines 41-42. A second flute with this configuration would obliterate the pilot tip 25 and render the tool unsuited for its intended purpose. Durfee does not disclose, teach or suggest the need for a second flute and cutting edge and the entire disclosure of Durfee makes it clear that such a modification would dramatically alter the operational characteristics of the tool. Further, the changes suggested by the Examiner would completely alter the methods and steps by which the Durfee tool is manufactured. The Durfee tool is disclosed as appropriate for its intended purpose and there is no suggestion that it be altered as proposed by the Examiner.

While it is true that rotary cutting tools with more than one cutting edge are known, this in no way leads one of skill in the art to modify Durfee as the Examiner suggests. Making the design changes to the spot-weld removing tool disclosed in Durfee as suggested by the Examiner requires a wholesale redesign of the tool and would eliminate the clearly stated advantages of the configuration specified in Durfee.

The Examiner's Proposed Combination of Durfee and George is Unsupported

The Examiner admits that Durfee does not disclose, teach or suggest the "chisel edge" recited in Applicant's claim 1. The Examiner turns to the teachings of George to remedy the deficiencies of Durfee. It is important to note that the Examiner makes no

attempt to identify **any** motivation for one of skill in the art to combine the teachings of Durfee with those of George as required by MPEP §2143.01.

As discussed in detail below, the teachings of George, when properly understood, are simply incompatible with the teachings of Durfee.

Teachings of George

It is important to note that the Applicant previously overcame a 35 U.S.C. §103 obviousness rejection where George was the primary reference. In this rejection, the Examiner repeats many of the inaccuracies and misinterpretations of George set forth in the Office Action mailed December 11, 2007.

The Examiner's assessment of the teachings of George is unsupported or inaccurate in at least the following respects:

- The Examiner argues that George teaches "a pair of linear cutting edges (36)." George **clearly teaches** that the cutting edge portions 36 extending from the central straight chisel edge 41 are "curvilinear", not linear as required by Applicant's claims. See George, Figures 3a and 4, col. 3, lines 38-45 and col. 4, lines 18-22;
- The Examiner argues that George teaches "a planar first flute surface (33)." It is important to note that the exact configuration of flute surface 33 is not discussed in George, so the Examiner's statement regarding its configuration is unsupported. It appears from Figures 2, 3, 3a, and 4 that the flute surface 33 is arcuate, not planar. See, in particular, Figure 4;
- The Examiner argues that George teaches a "conical land surface (45)." George refers to surfaces 45 as "peak surfaces" and fails to teach or suggest that these surfaces are "conical" as required by the claims. Further, the detailed discussion of the configuration of peak surfaces 45 with respect to other structures of the tool suggest that the peak surfaces 45 cannot be "conical" as required by the claims. See George, column 5, lines 23-43;

- The Examiner argues that George teaches "each said land surface (45) radially approaches said axis of rotation in a direction opposite said cutting direction." George does not disclose, teach or suggest that peak surfaces radially approach the axis of rotation of the drill. The peak surfaces 45 are described as "upwardly inclined", not conical and no relationship is specified in George between the peak surfaces and the axis of rotation.
- The Examiner argues that George teaches the *acute* included angle between linear cutting edges specified in Applicant's claims 2, 3, 7, and 8. In fact George teaches that the angle gamma cited by the Examiner "represents the angle of inclination of the peak surface 45 and associated first cutting edge portion 36 relative to the second straight portion 35 of the cutting edge (the horizontal)." George, column 5, lines 37-43. The angles described in George clearly teach an *obtuse* included angle between *curvilinear* cutting edge portions 36. This is in distinct contrast to the *acute* included angles between *linear* cutting edges recited in Applicant's claims 2, 3 and 7, 8. The Examiner's figure on page 4 of the rejection dated December 11, 2007 demonstrates that the *smallest* angle disclosed in George is an angle of 90°. George teaches away from increasing the value of gamma (thereby decreasing the included angle between curvilinear cutting edges 36, because to do so "weakens the peaked tip of the drill." George, column 5, lines 50-54.
- The Examiner closes her discussion of George with the statement "whereby the balanced geometry of the helical drill also prevents the drill from wobbling and creating deviations in the hole being formed." This teaching is specifically distinct from the teachings of Durfee, which clearly teaches eccentrically positioned cutting tip 42 and cutting edge 38 and emphasizes their benefits, e.g., reduced friction and extended tool life. Durfee, col. 4, lines 20 – 35.

  George does not support the Examiner's proposed combination.

The Proposed Combination Fails to Teach all Limitations of the Rejected Claims

Claim 1 recites "a pair of **linear** cutting edges, each cutting edge extending from one end of the chisel edge." As discussed in great detail above, the Examiner's proposed combination does not disclose, teach or suggest this limitation of claim 1.

Claim 13 recites "two diametrically opposed flutes, each said flute comprising a substantially planar first flute surface intersecting one of said land surfaces to form a cutting edge, **said flutes arranged to converge as they approach said tip and angularly overlap behind said tip**." The Examiner's proposed combination fails to disclose, teach or suggest each limitation of claim 13 as specifically cited above.

Claims 1-4 and 13-19 are Patentable Over the Proposed Combination

As discussed above, claims 1 and 13 are patentable over the Examiner's proposed combination of Durfee and George. The Examiner's proposed combination fails to meet the requirements for a ***prima facie*** showing obviousness rejection under 35 U.S.C. §103 as set forth in the MPEP § 2142.

Claims 2-4 depend directly or indirectly from claim 1 and are patentable for at least the reasons stated in support of claim 1.

Claims 14-19 depend directly or indirectly from claim 13 and are allowable for at least the reasons stated in support of claim 13.

Claim 15 is amended to include all the limitations of the base claim. Claim 15 is now in condition for allowance, according to an indication of patentability by the Examiner.

Claims 5 – 8

Claims 5 – 8 are rejected under 35 U.S.C. §103 over Durfee in view of George and U.S. Patent No. 7,147,414 to Mast et al. (Mast). This proposed combination suffers from all the deficiencies pointed out above with respect to the proposed combination of Durfee and George.

- The teachings of Durfee cannot be modified as suggested by the Examiner;
- The teachings of Durfee are incompatible with the teachings of George;
- There is no motivation in the references themselves or in the knowledge of those skilled in the art to combine the teachings of Durfee with those of George;
- Even if combined, the references do not teach all the limitations of claim 5 as specifically set forth below; and
- The teachings of Mast do nothing to cure the deficiencies of the Durfee/George proposed combination.

Claim 5 requires "said drill point including **a pair of substantially linear cutting edges inclined rearwardly from a chisel edge at the extreme forward end of said insert**, each said cutting edge defined by an intersection of a substantially planar flute surface and a substantially conical land surface."

As discussed above, Durfee fails to disclose, teach or suggest a chisel edge or two cutting edges. Modifying Durfee to include two cutting edges is incompatible with its express teaching and would render the rotary tool of Durfee unsuitable for its stated purpose.

The Examiner has misinterpreted George, which teaches a cutting tool point geometry unrelated to that of Durfee or Applicant's claims. There is simply no reason or motivation to combine the teachings of George with those of Durfee. Even if combined, the references fail to disclose, teach or suggest all the limitations of claim 5.

Claim 5 is patentable over the Examiner's proposed combination. Claims 6-9 depend directly or indirectly from claim 5 and are patentable for at least the reasons stated in support of claim 5.

Claim 6 recites "said substantially conical land surface has an axis of curvature that is offset from the axis of said shank." The Examiner's proposed combination fails to disclose, teach or suggest a spot drilling tool as recited in claim 5. Claim 6 is additionally patentable for at least this reason.

Claim 9 is amended to include all the limitations of the base claim. Claim 9 is now in condition for allowance, according to the Examiner's indication of allowable subject matter in the office action mailed August 5, 2008.

Given the extensive prosecution of this matter and the repeated rejection of Applicant's claims, the Examiner is respectfully requested to contact the undersigned counsel to discuss this Response, the claims and any opportunities to advance prosecution of this case.

For all the foregoing reasons, Applicant respectfully requests allowance of claims 1–9 and 13-19.

Respectfully submitted,

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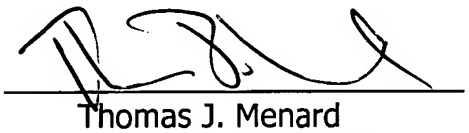
By 

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